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Posters

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99 HERITABILITY OF TEMPERATURE AND THE EFFECTS OF AGEING ON TEMPERATURE REGULATION: AN OBSERVATIONAL MULTI-COHORT STUDY

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Introduction: Ageing affects homeostasis and immunosenescence, resulting in aberrant fever and immune responses to infection in older adults. This study assesses heritability of basal temperature and explores effects of ageing on basal temperature and temperature in response to SARS-CoV-2 infection.
Methods: Observational study using multiple cohorts. Participants: (a) Twin volunteers: 1089 healthy adults enrolled in Twins-UK, mean age 59 (17); tympanic temperature measurements; (b) Community-based: 3972 adults using the COVID Symptom Study mobile application, age 43 (13); self-reported test-positive for SARS-CoV-2 infection; self-reported temperature measurements; (c) Hospitalised: cohorts of 520 and 757 adult patients with emergency admission to two teaching hospitals between 01/03/2020–04/05/2020, age 62 (17) and 68 (17) respectively; RT-PCR-confirmed SARS-CoV-2 infection.
Analysis: (a) heritability analysed using saturated and ACE univariate models; linear mixed-effect model for associations between basal temperature and age, sex and BMI. (b&c) multivariable linear regression for associations between temperature and age, sex and BMI; multivariable logistic regression for associations between fever(>/= 37.8°C) and age, sex and BMI.
Results: Basal temperature in twins demonstrated 50% heritability (95%CI[42–57%]). In healthy twin, community-based and hospitalised cohorts, increasing age is associated with lower temperatures, and increasing BMI with higher temperatures: (a) Twins (age:$p < 0.001$; BMI:$p = 0.002$); (b) Community-based (age: $p < 0.001$; BMI: $p < 0.001$); (c) Hospitalised (1st hospital: age: $p = 0.106$; BMI: $p = 0.033$; 2nd hospital: age: $p < 0.001$; BMI: $p = 0.010$). Increasing age was negatively and BMI positively associated with fever (1st hospital: Age: OR = 0.99, $p = 0.033$; BMI: OR = 1.00, $p = 0.045$; 2nd hospital: Age: OR = 0.99, $p = 0.010$; BMI: OR 1.02, $p = 0.038$).
Conclusions: Heritability of basal temperature suggests a genetic component to thermoregulation. Associations observed between increasing age and lower temperatures and higher BMI and higher temperatures are important in understanding effects of ageing and obesity on basal temperature and the fever response. In older adults, findings have important implications for defining fever thresholds and diagnosing infections, including SARS-CoV-2.